Building the Big Picture:

Identifying Wetland Management Opportunities in the Milwaukee River Basin

Photos from top: sandhill cranes, canoeing on a deep marsh, a ditch created to drain wetlands, and Blanding's turtle (State Threatened species).

Better information makes for better decisions. This is certainly true with public policy decisions regarding environmental management. It's also the guiding principle behind a new project to assess wetlands and the role they play in the Milwaukee River Basin – gathering the best information possible while building on the success of earlier projects.

In the last few decades, scientists have confirmed the critical role wetlands play in urban as well as rural areas. Not only do they provide habitat to a wide diversity of valuable plants and animals, wetlands reduce flooding, protect surface water quality, and provide scenic beauty and open space. These reasons inspire us as we work on gathering the best information about our area wetlands.

The Milwaukee River Basin Wetlands Assessment Project

Many of the wetlands in the Milwaukee River Basin have been destroyed, filled in or drained to create farm fields, cities and roads. The Milwaukee River Basin Wetlands Assessment Project seeks to understand the consequences of these losses and examine options for future planning.

Questions the project will consider include: What wetland resources do we have left and how do they benefit us? Where can former wetlands be restored for the most benefit for people and wildlife in the basin? The information gathered will then be shared with local planners, decision-makers and citizens for discussion and ultimately for decisions on how to protect and restore wetlands in the basin.

The Milwaukee River Basin has lost more than half of its original wetland acres. Wetlands are most abundant in the northern watersheds and least abundant in more developed areas.

Framing the Questions

The Milwaukee River Basin Wetlands Assessment Project is spearheaded by the Department of Natural Resources through a grant from the U.S. Environmental Protection Agency. It is a pilot project that will develop tools to improve planning wherever wetland resources are a concern. The project's core group includes wetland biologists, soil and water scientists and specialists in GIS (geographic information systems) analysis. We start with the understanding that all wetlands have value, but not all wetlands perform the same functions in the same way or to the same degree. Our aim is to produce a big picture view of the varying roles wetlands play to maintain water quality, prevent flooding, and provide habitat in the basin.

While the first goal of this project is to gain a thorough understanding of our remaining wetlands, the process will naturally lead us to examine different scenarios using GIS to help decide where wetlands can best be restored. The intent of the project is not to make final recommendations, but rather to give the people in the basin enough information to decide where restoration projects can bring the biggest bang for the buck to meet specific goals. It will be up to you, the residents, landowners and leaders of the basin, to use the information to take action as opportunities arise.

Resource managers, conservation groups, planners, biologists and wetland restorationists in the area are contributing their expert knowledge to make sure the final project will be as useful as possible. As the project progresses, we will share the emerging issues and data and get feedback and direction. The final project should be completed by January 2004.

What is GIS?

GIS, or Geographic Information Systems, is often called mapping software, however, it's also a powerful analytical tool. For this project, GIS will be used to create real-world models to simulate how the various features of the geographic area relate to one another. Combining layers of data about the wetlands, soils, roads, lakes, streams, land cover and drainage patterns creates the models, allowing visual and spatial relationships to be comprehended easily. GIS can compare current and future scenarios, allowing decision-makers to concentrate on real-life implications of the data. This also makes the management decision process more efficient.

The project – step by step

Fact-Finding...

We are reviewing local planning documents, existing data and talking with local natural resource experts to gather information on water and wildlife problems in the basin. In some cases, we will need to fill in information gaps. We'll identify flood-prone areas, streams and lakes that have water quality problems, and areas where fish and wildlife habitat has been lost or

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Working Wetlands: Water Quality, Flood Control and Habitat

Three major functions of wetlands are improving surface water quality, flood control and providing wildlife habitat

A wetland can act as a filter, holding runoff in place while absorbing nutrients and allowing sediment to settle out.

Many wildlife species, like these terns, rely on wetlands for critical habitat such as nesting sites.

Water Quality

Sediment and nutrients in lakes and streams come from natural erosion, road construction, residential and commercial development, agriculture and urban land uses.

Excess sediment and nutrients harm fish and wildlife and reduce public recreational opportunities.

Wetlands can improve water quality by removing sediment and nutrients in runoff from rainfall.

How much improvement depends on many factors including the surrounding land use, vegetation, how long a wetland holds water, and the location of a wetland in its landscape.

For example, small streams and headwater areas receive most of the basin's direct runoff, so establishing wetlands and other vegetated buffers in these locations will provide more water quality benefit than restoring wetlands further downstream.

Flood Control

Development and soil disturbance increase the risk of flooding and consequent damage to property and stream habitat. How wetlands help in flood control depends on their location and type.

Streams in watersheds with more wetland area generally flood less, have better water quality and more stable water flow. Wetlands adjacent to large streams, for example, can store water as the stream overflows. Headwater streams receive little overflow, but their surrounding wetlands still contribute to flood control by retaining surface water runoff. Using wetlands for flood control, however, requires additional considerations.

Not all wetlands can hold water long enough to prevent flooding, and changing wetland water levels may compromise plant communities, water chemistry and the wildlife that depend on them.

Development and wetland removal upstream can contribute to flooding downstream by reducing the capacity of the land to absorb the runoff water from heavy rains or snowmelt.

Wildlife Habitat

Improved water quality and flood control go a long way toward better fish and aquatic habitat, but what about other wildlife needs?

Frogs and salamanders need small, isolated wetlands or ephemeral ponds that are fish-free. Fish reproduction depends on the marshy wetlands connected to lakes and streams. Many wildlife species use floodplain forests as travel corridors, while waterfowl favor the wetlands that hold pools of water for longer periods.

Fragmenting larger wetlands is a problem for wildlife species that use wetlands. Roads and power lines can break up habitat, cutting off animal travel corridors and reducing protective cover. These gaps in wetland vegetation also allow invasive species, like purple loosestrife and reed canary grass, to gain a foothold.

Protecting and restoring larger tracts of habitat will provide the most benefits for wildlife. In urban areas, some small wetlands may be important for wildlife too.

Small temporary wooded wetlands and surrounding upland habitat are important in the life cycles of many animals, from invertebrates like transparent fairy shrimp to colorful wood ducks.

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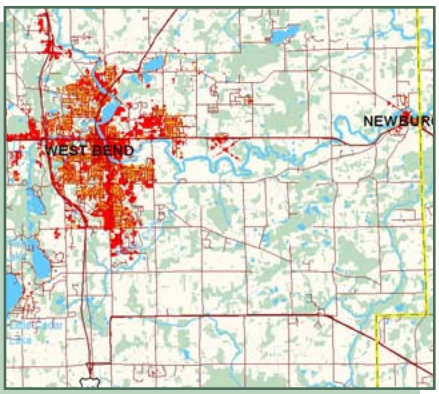
degraded. In order to provide a big-picture analysis, many related factors, such as how the landscape relates to surface waters and groundwater, will also be reviewed.

Conceptualizing...

When the background data has been collected, we'll use geographic information systems (GIS) tools to identify where wetlands help alleviate specific problems. We'll also produce maps showing where in the basin wetlands provide food, cover, shelter and travel corridors for animals, trap sediment and take up nutrients to maintain downstream water quality, and where wetlands detain water long enough to reduce flooding.



Prioritizing...

The final step will be to combine all of this information to suggest prioritized areas where wetland restoration and management actions can maximize habitat, flood reduction and water quality protection in the basin.

How will the information be used?

The GIS maps and other final products will help governments and conservation organizations better understand which wetland restorations are most likely to achieve flood prevention and improve habitat and water quality. Although this project will produce useful information for the "big picture," it will not tell us everything about any specific wetland. Fieldwork is always needed to sufficiently address specific management issues and restoration potential.

How can I learn more?

For more information, please contact:

Joanne Kline

2300 N Martin Luther King Jr. Drive
Milwaukee, WI 53212
414-263-8756
Joanne.Kline@dnr.state.wi.us

Tom Bernthal

P.O. Box 7921
Madison, WI 53707
608-266-3033
Thomas.Bernthal@dnr.state.wi.us

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Milwaukee River Basin

The Milwaukee River Basin is home to over one hundred types of rare plants and animals, like the prairie white-fringed orchid, a Federal Endangered species.

Upon completion of the Milwaukee River Basin Wetlands Assessment Project, a final report will be posted on the web in January, 2004 at:

clean-water.uwex.edu/milwaukee/links.html

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